Claims

1. A method of controlling a pest wherein said method comprises applying to the pest, or to a pest-inhabited locus, a pesticidally effective amount of an agent selected from the group consisting of:

(a) NPF polypeptides and functional equivalents thereof;

(b) cells comprising a polynucleotide encoding an NPF polypeptide and/or a functional equivalent thereof, which cells express said polynucleotide or functional equivalent to produce said NPF polypeptide; and

(c) viruses comprising a polynucleotide encoding an NPF polypeptide, or a functional equivalent thereof.

2. The method, according to claim 1, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 1, SEQ ID NO. 2, and functional equivalents thereof.

3. The method, according to claim 1, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SEQ ID NO. 4, and functional equivalents thereof.

4. The method, according to claim 1, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 5, SEQ ID NO. 6, SEQ ID NO. 7, SEQ ID NO. 8, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 11, SEQ ID NO. 12, SEQ ID NO. 13, SEQ ID NO. 14, SEQ ID NO. 15, SEQ ID NO. 16, SEQ ID NO. 17, SEQ ID NO. 18, SEQ ID NO. 19, SEQ ID NO. 20, SEQ ID NO. 21, SEQ ID NO. 22, SEQ ID NO. 23, SEQ ID NO. 24, and functional equivalents thereof.

5. The method, according to claim 1, wherein the NPF polypeptide is a fusion polypeptide.

6. The method, according to claim 1, wherein the agent is a pest food cell comprising a polynucleotide encoding an NPF polypeptide.

7. The method, according to claim 1, wherein the NPF polypeptide has from 2 to 10 amino acid residues.

8. The method, according to claim 1, wherein the NPF polypeptide has from 2 to 8 amino acid residues.

9. The method, according to claim 1, wherein the NPF polypeptide has from 2 to 5 amino acid residues.

10. The method, according to claim 1, wherein the NPF polypeptide inhibits synthesis of insect digestive enzymes.

11. The method, according to claim 1, wherein the agent comprises a dextrorotary amino acid.

12. The method, according to claim 1, wherein the agent comprises a non-classical amino acid.

13. The method, according to claim 1, wherein the NPF polypeptide is N-terminal carboxylated or C-terminal amidated or both.

14. The method, according to claim 1, wherein the polynucleotide is optimized for expression in said cell.

15. The method, according to claim 1, wherein the cells are mosquito larvae food cells.

16. The method, according to claim 1, wherein the cell is an algae.

17. The method, according to claim 1, wherein the cell is a *Clorella* species.

18. The method, according to claim 1, wherein the cell is a yeast cell.

19. The method, according to claim 1, wherein the cell is applied in a living state.

20. The method, according to claim 1, wherein the cell is applied in a non-living state.

21. The method, according to claim 1, wherein the agent is administered as a component of a pesticidal composition which also comprises a pesticidally effective carrier.

22. The method, according to claim 1, wherein the pest is selected from the group consisting of coleopterans, lepidopterans, and dipterans.

23. The method, according to claim 1, wherein the pest is a blood-sucking pest.

24. The method, according to claim 1, wherein the pest is a pest of the suborder Nematocera.

25. The method, according to claim 1, wherein the pest is a pest of the family Colicidae.

26. The method, according to claim 1, wherein the pest is a dipteran.

27. The method, according to claim 1, wherein the pest is a pest of a genus selected from the group consisting of *Heliothis*, *Culex, Theobaldia, Aedes, Anopheles, Forciponiyia, Culicoides* and *Helea*.

28. The method, according to claim 1, wherein the pest is selected from the group consisting of mosquitoes, flesh flies, fleas, sand flies, house flies, and dog flies.

29. The method, according to claim 1, wherein the pest is a mosquito.

30. The method, according to claim 1, wherein the pest is a pest species selected from the group consisting of: *Aedes aegypti, Culex quinquefasciatus, Anopheles albimanus, Anopheles quadrimaculatus, Lutzomyia anthrophora, Culicoides variipennis, Stomoxys calcitrans, Musca domestica, Ctenocephalides felis,* and *Heliothis virescens*.

31. The method, according to claim 1, comprising applying the agent to a pest-inhabited locus.

32. The method, according to claim 31, wherein the pest-inhabited locus is a body of water.

33. The method, according to claim 1, wherein the agent is administered in association with a pest food.

34. A method of preparing a pesticidal composition comprising transforming a pest food organism with a polynucleotide encoding an NPF polypeptide and bringing said transformed pest food organism into association with a pesticidally acceptable carrier.

35. The method, according to claim 34, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 1, SEQ ID NO. 2, and functional equivalents thereof.

36. The method, according to claim 34 wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SEQ ID NO. 4, and functional equivalents thereof.

37. The method, according to claim 34 wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 5, SEQ ID NO. 6, SEQ ID NO. 7, SEQ ID NO. 8, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 11, SEQ ID NO. 12, SEQ ID NO. 13, SEQ ID NO. 14, SEQ ID NO. 15, SEQ ID NO. 16, SEQ ID NO. 17, SEQ ID NO. 18, SEQ ID NO. 19, SEQ ID NO. 20, SEQ ID NO. 21, SEQ ID NO. 22, SEQ ID NO. 23, SEQ ID NO. 24, and functional equivalents thereof.

38. The method, according to claim 34, wherein the NPF polypeptide is produced in the pest food organism as a fusion polypeptide.

39. The method, according to claim 34, wherein the NPF polypeptide inhibits synthesis of insect digestive enzymes.

40. The method, according to claim 34, wherein the polynucleotide is optimized for expression in said pest food organism.

41. The method, according to claim 34, wherein the NPF polypeptide is N-terminal carboxylated or C-terminal amidated or both.

42. The method, according to claim 34, wherein the NPF polypeptide comprises a dextrorotary amino acid.

43. The method, according to claim 34, wherein the NPF polypeptide comprises a non-classical amino acid.

44. An expression vector comprising a promoter and a polynucleotide encoding an NPF polypeptide wherein the promoter has the capacity to control expression of the NPF polypeptide in a food organism of a pest.

45. The expression vector, according to claim 44, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 1, SEQ ID NO. 2, and functional equivalents thereof.

46. The expression vector, according to claim 44, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SEQ ID NO. 4, and functional equivalents thereof.

47. The expression vector, according to claim 44, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 5, SEQ ID NO. 6, SEQ ID NO. 7, SEQ ID NO. 8, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 11, SEQ ID NO. 12, SEQ ID NO. 13, SEQ ID NO. 14, SEQ ID NO. 15, SEQ ID NO. 16, SEQ ID NO. 17, SEQ ID NO. 18, SEQ ID NO. 19, SEQ ID NO. 20, SEQ ID NO. 21, SEQ ID NO. 22, SEQ ID NO. 23, SEQ ID NO. 24, and functional equivalents thereof.

48. The expression vector, according to claim 44, wherein the NPF polypeptide is a fusion polypeptide.

49. The expression vector, according to claim 44, wherein the polynucleotide is optimized for expression in said organism.

50. A transformed cell comprising a polynucleotide encoding an NPF polypeptide, which cell expresses said polynucleotide to produce said NPF polypeptide.

51. The transformed cell, according to claim 50, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 1, SEQ ID NO. 2, and functional equivalents thereof.

52. The transformed cell, according to claim 50, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SEQ ID NO. 4, and functional equivalents thereof.

53. The transformed cell, according to claim 50, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 5, SEQ ID NO. 6, SEQ ID NO. 7, SEQ ID NO. 8, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 11, SEQ ID NO. 12, SEQ ID NO. 13, SEQ ID NO. 14, SEQ ID NO. 15, SEQ ID NO. 16, SEQ ID NO. 17, SEQ ID NO. 18, SEQ ID NO. 19, SEQ ID NO. 20, SEQ ID NO. 21, SEQ ID NO. 22, SEQ ID NO. 23, SEQ ID NO. 24, and functional equivalents thereof.

54. The transformed cell, according to claim 50, wherein the NPF polypeptide inhibits synthesis of an insect digestive enzyme.

55. The transformed cell, according to claim 50, wherein the digestive enzyme is selected from the group consisting of trypsin and trypsin-like enzyme.

56. The transformed cell, according to claim 50, wherein the transformed cell is a pest food.

57. The transformed cell, according to claim 50, wherein the transformed cell is mosquito larvae food.

58. The transformed cell, according to claim 50, wherein the transformed cell is a green algae.

59. The transformed cell, according to claim 50, wherein the transformed cell is a *Clorella* species.

60. The transformed cell, according to claim 50, wherein the transformed cell is a yeast cell.

61. A pesticidal composition comprising:

(a) an agent selected from the group consisting of:

NPF polypeptides and functional equivalents thereof;

pest food cells comprising a polynucleotide encoding an NPF polypeptide and/or encoding functional equivalents of an NPF polypeptide; and

viruses comprising a polynucleotide encoding an NPF polypeptide, or encoding functional equivalents of an NPF polypeptide; together with

(b) a pesticidally acceptable carrier.

62. The pesticidal composition, according to claim 61, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 1, SEQ ID NO. 2, and functional equivalents thereof.

63. The pesticidal composition, according to claim 61, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SEQ ID NO. 4, and functional equivalents thereof.

64. The pesticidal composition, according to claim 61, wherein the NPF polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 5, SEQ ID NO. 6, SEQ ID NO. 7, SEQ ID NO. 8, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 11, SEQ ID NO. 12, SEQ ID NO. 13, SEQ ID NO. 14, SEQ ID NO. 15, SEQ ID NO. 16, SEQ ID NO. 17, SEQ ID NO. 18, SEQ ID NO. 19, SEQ ID NO. 20, SEQ ID NO. 21, SEQ ID NO. 22, SEQ ID NO. 23, SEQ ID NO. 24, and functional equivalents thereof.

65. The pesticidal composition, according to claim 61, wherein said polypeptide is a fusion polypeptide.

66. The pesticidal composition, according to claim 61, formulated as a slow-release formula.

67. The pesticidal composition, according to claim 61, in a form selected from the group consisting of pellets, briquettes, bricks, powders, granules, sprays, solutions and capsules.

68. The pesticidal composition, according to claim 61, formulated to float on an aqueous medium.

69. The pesticidal composition, according to claim 61, formulated to maintain a depth of 0 to 2 feet below the surface of an aqueous medium.

70. The pesticidal composition, according to claim 61, formulated to sink in an aqueous medium.